

Operation/ Gaming Issues  
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#### Assumptions

- For purposes of analysis, we are assuming
  - a constant 4 kcfs diversion at McDonald Island
  - A variety of pumping regimes at Bacon.
- Up to 1.5 kcfs of McDonald Island diversions would be delivered to south Delta agriculture.
- Clifton Court would retain the ability to operate at up to 15 kcfs (need confirmation on this).

#### Issues

- 1) Possible Operational Priorities, in no particular order:
  - a) Protect South Delta water quality, reliability, and water levels
  - b) Reduce salinity and TOC in urban supplies
  - c) Reduce fishery entrainment
  - d) Improve export water supplies
- 2) Operational/ infrastructure shifts depend upon which priority is to be emphasized. Possible operations to meet these various priorities is given below:
  - a) South Delta Priority.
    - i) Deliver enough water to meet South Delta agricultural needs at all times, for ag areas tied to the Central Delta Diversion System (CDDS).
      - (1) If diversion is problematic at certain times of the year, then either accept the fish loss (with screens net effect should still be positive) or build an intertie to Bacon Island with enough capacity to serve agriculture for a period of weeks without pumping. Operate Bacon to keep enough storage to meet south Delta agricultural needs during periods of high biological sensitivity.
      - (2) The diversion to meet South Delta ag needs should not count against Project water rights.
    - ii) If south Delta ag areas remain which depend upon south Delta channels, then
      - (1) Pump at least enough water through CCFB and Tracy to retain south Delta water quality
      - (2) Cap pumping at levels that create south Delta stage problems.
  - b) Urban Water Quality Priority.
    - i) Plumb the CDDS to allow McDonald/ Bacon supplies to be injected either at CCFB or at Tracy.
    - ii) Shift federal urban supplies from the DMC to the CA Aqueduct.
    - iii) Construct a bypass at O'Neal Forebay to allow DMC water to remain segregated from CA Aqueduct water.
    - iv) When the Delta is in balance during the TOC peak in February and March, shift pumping out of Banks and into Bacon for storage. During VAMP and after, deliver that water from Bacon to agriculture via the DMC. Trade for Tracy water during a period of higher water quality.
    - v) Use Bacon as a pass through facility when salinities are low. With a 4 kcfs intake, the residence time of stored water would be approximately 12 days. This would reduce TOC production.
    - vi) When Delta salinity begins to rise during the summer, stop running water through Bacon. Later in the summer, when salinities are high, deliver the water through CCFB if TOC remains low or use the water to enhance Delta outflow to hold down Delta salinity at CCFB.
    - vii) Modify urban delivery patterns to emphasize increased deliveries during periods of reduced salinity (rather than banking so much water in SLR), with reduced urban deliveries during periods of increased Delta salinity.
      - (1) This technique requires local storage to buffer the change in deliveries.
      - (2) The effect would be to slow the winter filling of SLR and to hasten the drop in SLR during the spring. Conversely, SLR storage levels would be more stable in the summer.

- (3) This is very similar to the "demand shift" typically carried out in order to meet SLR lowpoint problems, but with the urban payback focused on the low salinity periods in winter and spring.
- c) Fishery Priority
  - i) Operate all three intake points on an opportunistic/ real-time basis. Each day, pumping regime would be based upon:
    - (1) Species/ life stages in vicinity of each intake point.
    - (2) Screening characteristics.
    - (3) Priority given to individual species.
    - (4) Flexibility of the system to accommodate shifting in total pumping.
  - ii) Shifting would take place in time (with reduced overall pumping during some periods compensated by increased pumping during other periods) and space (pumping would take place at the intakes with the most favorable characteristics.
  - iii) Typically, this priority would reduce pumping during the spring, and maximize during the summer and fall.
- d) Export water supply.
  - i) Use Delta storage as a new yield enhancing facility.
  - ii) Use spacial shifting between intake points to reduce frequency of ESA "red light" occurrences.
  - iii) Use expanded overall pumping capacity to increase deliveries.
- 3) Possible operational scenario
  - a) The program is probably not worth doing unless it solves the south Delta water quality and stage problems and avoids the need for barriers. Therefore, the south Delta should probably get top operational priority. This means that enough water to meet south Delta needs and avoid staging problems must be delivered at all times. Restrictions in deliveries due to fish take cannot be allowed. If necessary, Bacon Island should be used to allow such deliveries to be made during outage periods.
  - b) Urban exporters have declared that they are more interested in water quality improvements out of this program than yield. Therefore yield should probably receive the lowest priority.
  - c) The main remaining questions have to do with fishery protection vs export water quality (and particularly urban water quality). The easiest way to explore this operation would be to run a game. For example:
    - i) The Projects control the McDonald Island intakes.
      - (1) McDonald is allowed to operate year round at 4 kcfs at the discretion of the Projects. Out of this 4 kcfs of flow, the Projects must subtract off enough to meet local needs.
      - (2) CCFB will continue to operate under existing COE criteria. This means that total export capacity will rise by (4 kcfs - deliveries to the South Delta).
      - (3) Presumably, the Projects will shift between McDonald and CCFB, depending on source quality. Also, high TOC and high salinity water would be preferentially shifted to the DMC.
    - ii) The EWA controls the Bacon Island intake.
      - (1) EWA may require the Projects to take Bacon water in preference to water from the McDonald intakes or CCFB, provided that any water quality degradation is below certain criteria.
      - (2) EWA may use Project conveyance when surplus capacity is available. However, the Projects may elect to move the EWA water as they see fit, provided that EWA receives proper credit in SLR. Thus, if the EWA wishes to move Bacon water during VAMP, the Projects may
        - (a) Move the water to SLR through the CCFB.
        - (b) Send the water through Tracy to agriculture (to avoid high TOC).
        - (c) Hold the water in Bacon for later delivery through Tracy or for Delta outflow.
 However, the Projects would need to credit the water toward the EWA in SLR and the Project water in Bacon would become low priority water, subject to spilling.
    - iii) That is, instead of attempting to develop an integrated optimum operations plan, we could divide up operations rights and then allow the two interests to interact.

- d) Operations and plumbing may depend on the goals of south Delta operations.
  - i) Urban areas are worried about salinity/bromide and TOC.
  - ii) Ag areas are only worried about salinity.
  - iii) Therefore, one goal of operations should be to reduce TOC for urban while reducing salinity for both urban and agriculture.
  - iv) This argues that Bacon diversions during periods of high TOC should be delivered to agriculture, while